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STRATEGIC MISSION IMPLEMENTATION: A VALUE FOCUSED APPROACH

Steven F. Baker, Steve G. Green, James K. Lowe
Department of Management,
2354 Fairchild Drive, Suite 6H90
USAF Academy, Colorado 80840
719-333-3670 (voice), 719-333-6880 (fax)
steve.baker@usafa.af.mil

Vernon E. Francis
The SABRE Group
MD 4231 Box 619616
Dallas/Ft Worth Airport, Texas 75261

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ABSTRACT

This paper offers an approach for performance-based decision making and budgeting that objectively orders alternatives according to established mission criteria. We employ a model using Value-Focused Thinking (VFT) to address the contemporary focus on performance and mission-oriented results. The laboratory equipment budget at the US Air Force Academy is used to illustrate how over $1 million of funding was allocated without the divisive claims of departmental inequity. We provide an objective rubric for assessing how well aligned the organization's decisions are relative to its stated mission. Finally, we note that the approach accommodates the flexibility to allocate initial budget allocation as well as year-end residual. As organizations make significant strides toward implementing performance-based decision and budgeting systems, VFT shows considerable promise for improving strategic mission implementation.

INTRODUCTION

Decision-making that optimally allocates scarce resources has always been a critical management skill. Recently, selecting alternatives that have the most impact on the organization's mission has also become a paramount concern. Unfortunately, developing objective measures that prioritize alternatives when mission statements are subjective and vague is problematic. However, a renewed focus on mission-oriented results, ushered in by a host of federal legislation and popular management philosophies, has compounded the significance of the challenge (Figura, 1999). In many cases, time-proven analytical approaches do not provide adequate information for decision-makers. More than ever before, decision-makers must temper their

decisions based upon both internal organizational consequences while meeting the demands of external stakeholders. This emerging focus on outputs, outcomes, and results, in the context of strategic mission implementation, is the focus of this paper.

We offer an approach that satisfies the needs of internal and external stakeholders. The approach provides a sound analytical foundation for complex strategic decisions, while offering an objective rubric for assessing how well aligned the decision are to the organization's mission. The approach may be used for a broad range of situations where allocation of scarce budgetary resources is complicated by competing projects, all of which contribute to organizational performance. This type of performance-based budgeting requirement will undoubtedly drive the decision making landscape for the foreseeable future.

Strategic decision tools that rely upon and assist the development of performance metrics are especially valuable within the DoD and other government agencies. Legislation compliance is compounded by the explicit need to improve taxpayer confidence by holding agencies accountable for achieving results. The 1993 Government Performance and Results Act's (GPRA) primary purpose is to improve decision making and the internal management of the government. It shifts the focus of federal agencies away from traditional concerns of staffing and activity levels toward a single overriding issue: results (GAO, 1996). While performance promises have accompanied funding requests in the past, GPRA explicitly mandates the financial consequences of not fulfilling stated promises. Organizations must reflect specific results that are visible and reportable to legislators and ultimately taxpayers (Comes and Riley, 1999). If these results are not aligned with the organization's mission, funding might be adversely affected, and the value the organization provides might come into question. In fact, according to the Office of Management and Budget (OMB), which is responsible for implementing and monitoring the GPRA, "...eventually, the annual performance plan will be integrated with the agency's budget report." (OMB, 1998). Goals and outcomes accompanying organizational mission statements must be measurable, and eventually linked to specific budget requests. Observers contend that legislators barely disguise their intentions to use this type of information as ammunition to reduce federal manning levels (Laurent, 1997).

To complicate matters, managers must still make decisions that are sensitive to intra-organizational dynamics. They must make resource allocations that might spark criticisms of shortsightedness or favoritism. If performance of activities cannot be measured or aligned with organization missions or goals, then the value of that activity should come under scrutiny. Ideally, decision-makers can approach situations with a tool that addresses both internal and external stakeholders.

Our approach uses Value Focused Thinking to provide the credible information required to immediately put into action a performance-based decision and budgeting process that considers both internal and external perspectives. It allows an organization to take that first

step toward implementing a mission-oriented budgeting and management system.

VALUE-FOCUSED THINKING

Multi-Attribute Decision Analysis is specifically designed to meet the need for an objective means assessing resource allocation scenarios (Keeney, 1976, Hwang and Yoon, 1981). However, while the methodology helps in efficiently allocating resources between competing objectives, it does not guarantee the "right" objectives were identified and defined. Value Focused Thinking (VFT) focuses attention upon organizational values, which can be translated into objectives. This approach places value on mission effectiveness and objective measures. It prescribes importance, which allows decision-makers to shape the future, and appears to be ideally suited for long-range, guidance-type decisions (Keeney, 1992). VFT requires the judgement of experts regarding future values and interpretation of organizational missions and goals. Because they are mission, as opposed to profit oriented, this methodology seems ideally suited for the public sector.

The United States Air Force recently employed VFT to evaluate the value of future air and space forces in the AIR FORCE 2025 Study. The Foundations 2025 model "...successfully scored 43 futuristic system concepts ... on 134 attributes ... and provided insights about the most promising system concepts and technologies." (Parnell, *et al.*, 1998). This technique was also successfully employed for Spacecast 2020, a study to identify future space system concepts (Burk and Parnell, 1997). Another recent study involving VFT evaluated the past performance and prescribed future efforts of AFROTC detachments (AFROTC Viability Study; Hague, Newton, and Lowe, 1998). All of these large-scale successful applications of VFT add to the track record of providing a sound analytic foundation for complex, strategic decision-making.

A multi-attribute approach was employed to maximize benefits in the repair of Canadian Forces land-based equipment (Mitchell and Bingham, 1986). Likewise, a hierarchical approach was used to generate objective function weights necessary to support a large-scale goal program model of a multi-year Army Personnel Planning Model (Gass, 1986).

The original hierarchical model described in this paper was motivated by the Analytic Hierarchy Process (AHP), developed and applied by Saaty (1980, 1982, 1990). "The AHP is useful in priority setting (ranking), but it is its extension to planning and resource allocation decisions where it may ultimately have its greatest utility" (Liberatore, 1987[1], p.13). However, for the case study described in this paper, the decision-makers were comfortable using a modified *Delphi Process*, to directly assess the hierarchy. Within the *Delphi Process*, they relied upon pair-wise comparisons to determine several attribute measures.

Liberatore relied upon the AHP/Optimization approach in creating a decision support system to allocate funds to R&D projects (Liberatore, 1987[2]). While his hierarchical development and attainment of attribute weights were similar to our approach, a difference was that he included financial

considerations (return on investment, market share, *etc.*) within his value hierarchy and weighted these aspects along with other desirable R&D attributes. Our model kept cost and budget considerations out of the Value Hierarchy, but included these concerns as *posteriori* constraints. The potential impact of this modeling difference cannot be predetermined (Bernhard, 1990). Both approaches eventually assign a "weight to cost." However, our model relies upon an optimization to create the "opportunity costs" of constraints (budget) rather than asking decision-makers to make the tradeoff *a priori*. French (1988, 1989) provided the theoretical basis which guided our modeling strategy (see also Melese, Lowe, and Stroup, 1997).

Finally, sensitivity analysis provides comfort to stakeholders by illustrating the effect upon the final unit rank order of changes to the attribute weights. Vazsonyi (1995) and Kirkwood (1997) present practical examples of performing and presenting sensitivity analysis results. Vazsonyi's "performance" profile ideas formed the basis of the sensitivity charts used by our approach.

CASE STUDY: THE DEAN'S EQUIPMENT BOARD (DFEB)

The Dean of the Faculty at the United States Air Force Academy is faced with many diverse resource allocation decisions. One such decision involves the disbursement of approximately $1M for laboratory and other equipment. Accordingly, this disbursement requires an "equitable" distribution of budget authority among widely disparate requests. Historically, the process has been emotionally charged due to the reported urgent nature of almost all of the requests and the seemingly constant reduction of available funds. To provide a non-parochial approach, an Equipment Board (the DFEB) was established with representatives from each academic division to equitably allocate funds across the faculty. This allocation was not straightforward; equipment requests came from 19 departments and supporting staff agencies with widely varying requirements.

By the nature of their academic disciplines, the 9 departments in the Social Science and Humanities Divisions were less inclined to have requests that approached the dollar figures of the 10 departments found in the Engineering and Basic Science Divisions. However, organizational climate could be adversely affected if requests were determined by relative dollar size alone. What was required was an objective means of prioritizing the equipment budget allocation that was efficient, credible, traceable, relevant, and considered fair by the competing department heads. Originally, the DFEB considered several factors in allocating funds. To its credit, the DFEB rejected the straightforward but ill-considered method of simply dividing the funds equally across departments. The limitations of this approach are well documented (*e.g.*, Melese and Lowe, 1992).

The DFEB ultimately decided to use a VFT approach, which placed value on objective measures contributing to mission effectiveness and appeared to be ideally suited for this type of strategic decision (Keeney, 1973, 1976, 1992). The approach required the judgment of

experts regarding future values and interpretation of organizational mission and goals. The type of decisions the DFEB typically faces appeared to be a classic budget allocation decision across competing objectives since the departments were so inherently different. Coincidentally, the Academy was in the process of establishing institution, education, and department outcomes (largely in response to accreditation demands). Thus, the time was ripe to adapt these viable targets as metrics for performance. The DFEB would use these metrics to develop a process for funds distribution that would maximize the effect (or value) of the Academy's educational program (or mission).

The original modeling approach supported by the Dean was an Equipment Board Hierarchical Model (Francis, 1989). The fact that the model survived a decade, numerous department heads, and rotating DFEB members lends to its credibility. Our efforts were to validate and update the model to create a closer link to the institutional values and mission (thus the reliance upon the VFT), which had been reviewed and clarified during the intervening decade. Finally, our model had to incorporate the dynamics associated with a government fiscal environment. Of particular interest was its flexibility to not only prioritize initial budget allocation, but also to address year-end budget residual funds when applicable. In either case, deriving an objective metric of how much positive impact each request would have on the mission proved to be a very powerful tool. The fact that this approach was a potential first step toward GPRA compliance and organizational goal congruence provides compelling rationale for other organizations to consider its virtues.

HIERARCHY DEVELOPMENT

Consensus building with respect to equipment selection criteria was essential to the success of the hierarchy development. Recognizing this, the DFEB consisted of a Chairman, a Budget Representative, and a member from each of the four academic divisions: 1) Basic Sciences, 2) Engineering, 3) Social Sciences, and 4) Humanities. Their task was to develop criteria and preference weights which supported the Academy's mission and educational outcomes, as well as to "level" all potential parochial division agendas.

After carefully considering the Academy's mission and educational outcomes, the DFEB agreed on three main criteria for equipment purchases: 1) the intended equipment ***usage***, be it for ***curriculum, research,*** or ***support;*** 2) whether the equipment ***type*** served a ***new*** or ***replacement*** role; and 3) the individual department's subjective ***desire*** for a piece of equipment. When first developed, the board included a fourth criterion: whether the equipment had been planned for in the department's budget. However, this "budget" criterion represented only a procedural issue, and did not reflect the underlying values of the institution. Instead, the board recently updated this criterion to ***hazard***, which reflected the more contemporary issues of workplace safety and environment regulations. Figure 1 depicts the updated hierarchy.

Under the ***usage*** criterion, the established sub-criteria of ***curriculum,***

Equipment Board Value Tree

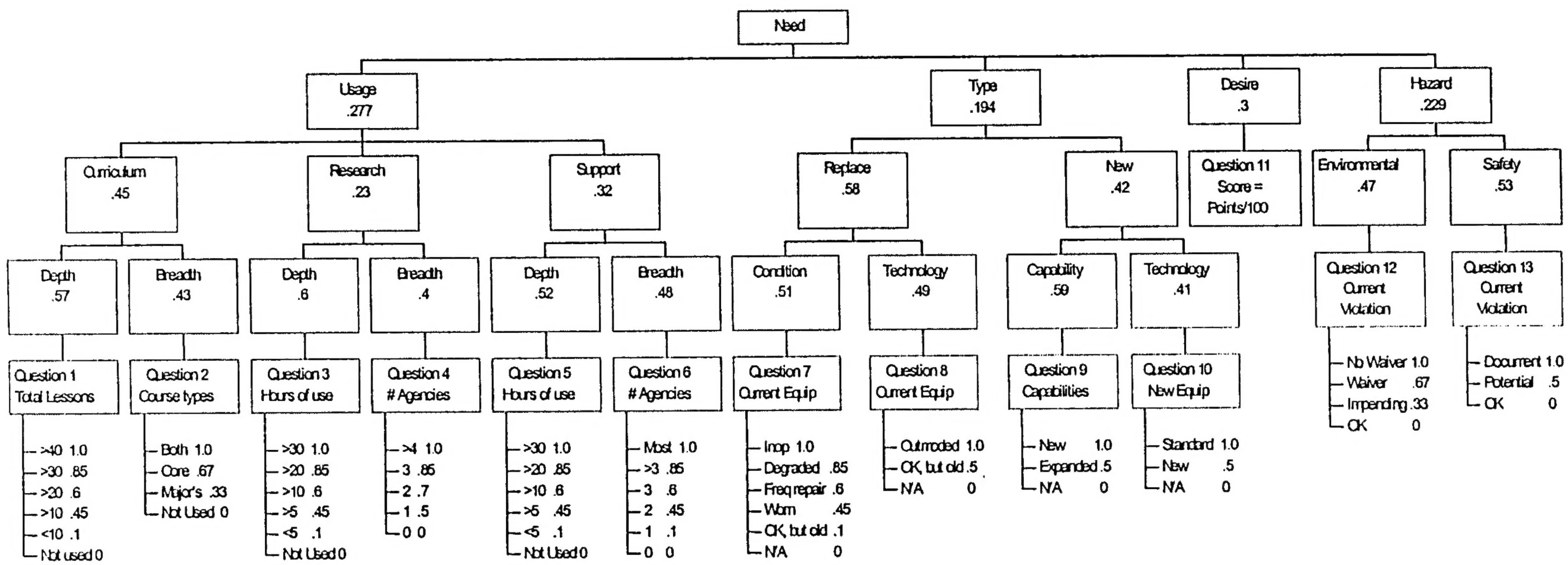

Figure 1 The USAFA equipment selection hierarchy tree reflects the board's primary selection criteria: 1) intended usage, 2) type, 3) departmental desire, and 4) hazard redress. Below each primary criterion are sub-criteria and measurable attributes. Each piece of proposed equipment is assigned a score for each of the 13 measurable attributes. That score is multiplied by all "parent" criteria and sub-criteria weights. For example, equipment used only in Major's courses would receive a .0177 score (.277x.45x.43x.33) for the *Usage-Curriculum-Breadth* criterion. The overall score is then computed by summing each of these 13 components.

research, and ***support*** clarified whether the equipment was primarily intended for the classroom, faculty research and enrichment, or whether it fulfilled some need not directly related to academia. Below each sub-criterion, the attributes *breadth* and *depth* provided an opportunity to score each equipment request. *Depth* was scored by the amount of equipment usage, given in hours or lessons. We assigned a *breadth* score based on how many courses or departments the equipment would be used.

The ***type*** criterion was broken into ***replace*** and ***new*** sub-criteria. In the case of equipment to be ***replaced,*** categorical descriptions of the current equipment's *condition* and its *technological* obsolescence as measurable attributes were used. *New* equipment was measured categorically by its enhancement to existing *capability,* and by how contemporary the equipment's *technology* was with respect to its intended use.

The ***desire*** criterion allowed each academic department to prioritize it's own equipment requests. This was deemed reasonable, given that DFEB's charter was to prioritize purchases across diverse disciplines, not within a given discipline. Unlike other value models, departmental flexibility was "built-in." For example, all board members agreed that autonomy within a department was prudent. Each department received a point allocation for this criterion based on their number of requests. A single request could receive 100 points; two requests could receive only a *total* of 180 points. However, no request could be assigned more than 100 points, which thwarted the temptation to generate additional requests solely to shift points to a genuine need.

The DFEB decided that fairness across departments could be incorporated into the ***desire*** criterion. In a departure from traditional VFT, the DFEB forced each department to rank order their requests (prior to calculating the value function) and considered the top two of each department prior to all others. This "top-two" rule was not arbitrary; it reflected a sense of equity as well as realistic upper bound on the total amount of equipment the budget could support. All additional requests were ranked below the combined "top two" lists from all departments.

Hazard was broken into sub-criteria of ***Environmental*** and ***Safety.*** These were scored based on the categorical level of redress new equipment provided. Existing violations of law or regulation received the highest priority; impending or potential violations received lower scores.

Throughout the development process, the DFEB carefully considered the Dean of Faculty mission. For example, a primary educational outcome of the Academy is: "Fundamental integrated knowledge: breadth and depth." The DFEB used this and other mission-oriented statements when designing the value hierarchy and tree.

The levels of the tree depicted in Figure 1 specify the primary criteria, the sub-criteria (if applicable), and the measurable attributes. Figure 1 also shows the weights determined by the method next described.

HIERARCHY WEIGHTING

After reaching consensus on the structure of the tree, the DFEB turned to

establishing the relative weights for the criteria, sub-criteria, as well as assigning scores for each measurable attribute. Rather than utilize the pair-wise comparisons suggested by AHP, the DFEB employed a modified *Delphi Process* and directly created the hierarchy's attribute weights. This process was possible since board members thoroughly understood the hierarchy, the weights assigned to attributes, and the resulting value function. (Crawford and Williams, 1985, discuss the use of subjective weighting matrices). The resulting *Delphi Process* accomplished two goals for the facilitators. First, the process provided the vehicle to insure each board member understood the hierarchical process. Second, the process allowed members to voice their opinions without reservation. Within the *Delphi Process*, each member responded by evaluating the relative importance of each criterion and sub-criterion. For example, Figure 2 depicts the worksheet used to establish the relative importance of ***curriculum usage***, ***research usage***, and ***support usage***.

When the DFEB initially convened, three iterations were necessary to achieve consensus. Each iteration consisted of soliciting individual scores, and meeting as a group to present those individual results (based upon Saaty's AHP method, 1982). More recently, the weight determination proceeded much quicker, no doubt due to the face-validity of the earlier work, as well as the VFT emphasis upon values leading to objectives. The DFEB agree on all the weights after the first iteration of the *Delphi Process*.

Once the DFEB decided on the relative weights, normalizing the values so that each criterion level of the tree summed to one was straightforward. Note in Figure 1 that the attribute scores (in contrast to the criteria weights) do not sum to one; the highest score for each attribute was assigned 1; lower scores were scaled according to DFEB members' assessment.

SURVEY, FINDINGS AND RESULTS

The DFEB developed a survey consisting of a question relating to each sub-criterion, which was scored by multiple choice response (see appendix). The academic departments completed a survey for each of their equipment requests. As with most surveys, there was some initial confusion as to how to complete the questionnaire (particularly with respect to assigning points under the ***desire*** criterion). Eventually, each department complied.

Figure 3 lists each equipment request and its corresponding VFT score. The first and second priority requests for each department are sorted separately at the top; remaining requests are sorted below the "top two" list.

A few items were removed from the list administrative reasons (e.g., the items were unavailable, or were funded by other sources), but the priority was unchanged for the remaining ones. Ultimately, items with a score greater than 28.0 were funded immediately, corresponding to just over $1 million. The remaining items successfully competed for year-end funds, thanks to the mission justification offered by this process.

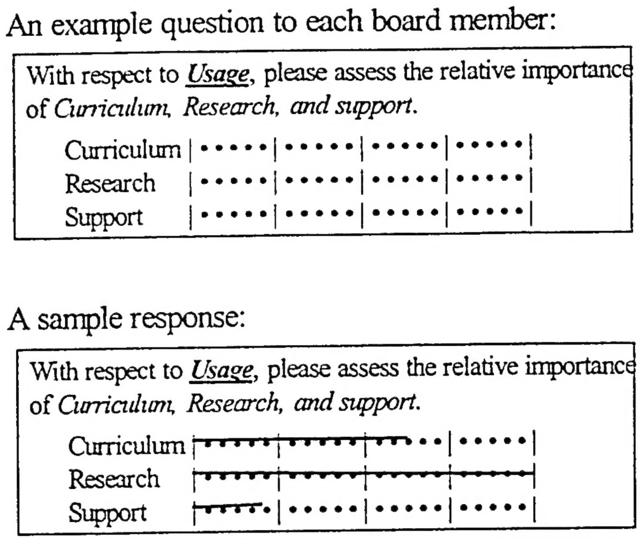

Figure 2 We established consensus on the appropriate weights for the hierarchy tree by having each board member draw horizontal histobars reflecting relative importance. In this case, the respondent considered curriculum use roughly 5/8 as important as research use, and support use just under 1/4 as important as research use. The entire board was presented with all the respondents' answers; conflicts were resolved by the Delphi method.

SENSITIVITY ANALYSIS

The DFEB was concerned of the effect that their specific preference weights would have upon the final rank ordering of equipment requests. To address this concern, we altered the preference weights of the four primary factors (***usage***, ***desire***, ***type***, and ***hazard***) first by 10%, then 20%, and evaluated the resulting rank orderings. The sensitivity of each factor was performed independently. For instance, when ***desire*** was altered from its original 30% value to 27% (a 10% change), the preference weights of the remaining three factors increased proportionately.

The results were somewhat unexpected. Although the DFEB believed ***hazard*** to be an important factor, it had almost no impact upon the final equipment rankings. As seen in Figure 4, only 10% of the equipment items moved within the overall rankings despite an increased preference for ***hazard*** from 15% to 25%. Based upon this information, we will initiate efforts to improve the measurement of ***hazards***. Similarly, ***type*** sensitivity (Figure 5) did not significantly affect the overall item rankings. Again, future efforts will address the value-added of this dimension (new versus replacement technology) to create a more discriminating metric.

On the other hand, ***usage*** and ***desire*** (Figures 6 and 7) were influential in their impact on the final rankings. For example, item #33's position was very sensitive to ***desire*** preference. Its rank ranged from 30th to 40th, as ***desire*** became more important (d-20% to d+20%). This piece of equipment was important, but it was not its department's first choice. Similarly, items #5 and #10

Department and Priority Number	Item Description	Number Requested	Unit Cost	Total Cost	Cumulative Cost	Value Tree Score
DFX	STAND, VID	10	$XXX	$XXX	$XXX	63.5
DFX	DIGITAL OSCILLOSCOPES	11	$XXX	$XXX	$XXX	47.2
DFX	CONTROLS LAB SERVO-MOTORS	14	$XXX	$XXX	$XXX	46.7
DFX	CONVERTER, VID	7	$XXX	$XXX	$XXX	46.2
DFX	VESTIBULR ILLUSION DEMONSTRATOR	1	$XXX	$XXX	$XXX	45.3
DFX	BENCH TOP POWER SUPPLIES	6	$XXX	$XXX	$XXX	44.3
DFX	FINE ELECTRON BEAM TUBES	2	$XXX	$XXX	$XXX	44.3
DFX	FUNCTION GENERATOR	5	$XXX	$XXX	$XXX	44.2
DFX	SOIL SAMPLING RIG	1	$XXX	$XXX	$XXX	40.2
DFX	XENETECH ENGRAVER TABLE	1	$XXX	$XXX	$XXX	40.0
	----------"Top Two" List above, all other requests below--------					
DFX	OVERHEAD PROJECTOR	17	$XXX	$XXX	$XXX	55.3
DFX	STAND, PROJECT	17	$XXX	$XXX	$XXX	50.7
DFX	WALK-IN COLD ROOM UNIT	1	$XXX	$XXX	$XXX	47.1
DFX	MOTION CONTROLLER	1	$XXX	$XXX	$XXX	46.0
DFX	CINEMA CLASSICS VIDEODISCS	10	$XXX	$XXX	$XXX	42.8
DFX	FIBER LAUNCH	1	$XXX	$XXX	$XXX	42.5
DFX	DATA ACQUISITION EQUIPMENT	2	$XXX	$XXX	$XXX	42.2
DFX	FATIGUE TEST MACHINE UPGRADE	1	$XXX	$XXX	$XXX	41.8
DFX	OPTICAL ISOLATOR	1	$XXX	$XXX	$XXX	41.6
DFX	FUNCTION GENERATOR	6	$XXX	$XXX	$XXX	41.1
DFX	VIBRATION ISOLATION LEG	1	$XXX	$XXX	$XXX	40.6
DFX	OSCILLOSCOPE	48	$XXX	$XXX	$XXX	40.5
DFX	COMPLETE ROTATIONAL SYSTEM	34	$XXX	$XXX	$XXX	39.9
DFX	ELETROSTATICS LABORATORY SYSTEM	6	$XXX	$XXX	$XXX	38.5
DFX	VIDEO IMAGING SYSTEM	1	$XXX	$XXX	$XXX	37.8
DFX	10KIP LOAD CELL	1	$XXX	$XXX	$XXX	37.4
DFX	EQUIPMENT TRAILER	1	$XXX	$XXX	$XXX	37.1
DFX	ASPHALT PAVING MACHINE	1	$XXX	$XXX	$XXX	36.2
DFX	EM-SCAN ANALYSIS SYSTEM	1	$XXX	$XXX	$XXX	35.2
DFX	HECD LASER	1	$XXX	$XXX	$XXX	31.4
DFX	SPACE SIM MAGNETIC FIELD CONTROL	1	$XXX	$XXX	$XXX	31.2
DFX	CW DOUBLED YAG LASER SYSTEM	1	$XXX	$XXX	$XXX	31.1
DFX	FINE ELECTRON BEAM TUBES	4	$XXX	$XXX	$XXX	30.8
DFX	WAREHOUSE PALLET JACKS	2	$XXX	$XXX	$XXX	29.3
DFX	HYDRAULICS FLOW BENCH	1	$XXX	$XXX	$XXX	29.1
DFX	UNCONFINED COMPRESSION TESTERS	2	$XXX	$XXX	$XXX	28.6
DFX	SPACE SIM THERMAL CONTROL EQUIP	1	$XXX	$XXX	$XXX	28.2
	----------FUNDING LINE----------					
DFX	DIRECT SHEAR TESTERS	2	$XXX	$XXX	$XXX	27.1
DFX	NUCLEAR DENSIOMETER-TROXLER	1	$XXX	$XXX	$XXX	26.7
DFX	SPECTRUM ANALYZER	1	$XXX	$XXX	$XXX	26.6
DFX	PULSED ENERGY METER	1	$XXX	$XXX	$XXX	26.2
DFX	LOCK-IN AMPLIFIER	1	$XXX	$XXX	$XXX	25.3
DFX	THERMO AND STATIS MECHANICS DEMOS	1	$XXX	$XXX	$XXX	24.7
DFX	MICROWAVE OPTICS	1	$XXX	$XXX	$XXX	24.3
DFX	EMISSIONS TESTER	1	$XXX	$XXX	$XXX	23.1
DFX	WEATHER MONITORS	1	$XXX	$XXX	$XXX	22.3
DFX	CARBON MONOXIDE METER	1	$XXX	$XXX	$XXX	20.3
DFX	MAGNETIC TORQUE DEMONSTRATOR	5	$XXX	$XXX	$XXX	20.3

Figure 3 The requested equipment for the USAFA Dean of Faculty is prioritized by department desire and total value tree score. The first and second most desired items for each department are given highest priority; remaining items are listed by score only. Items above the funding line received immediate funding, while the remaining items successfully competed for year-end funds (department names and costs have been masked).

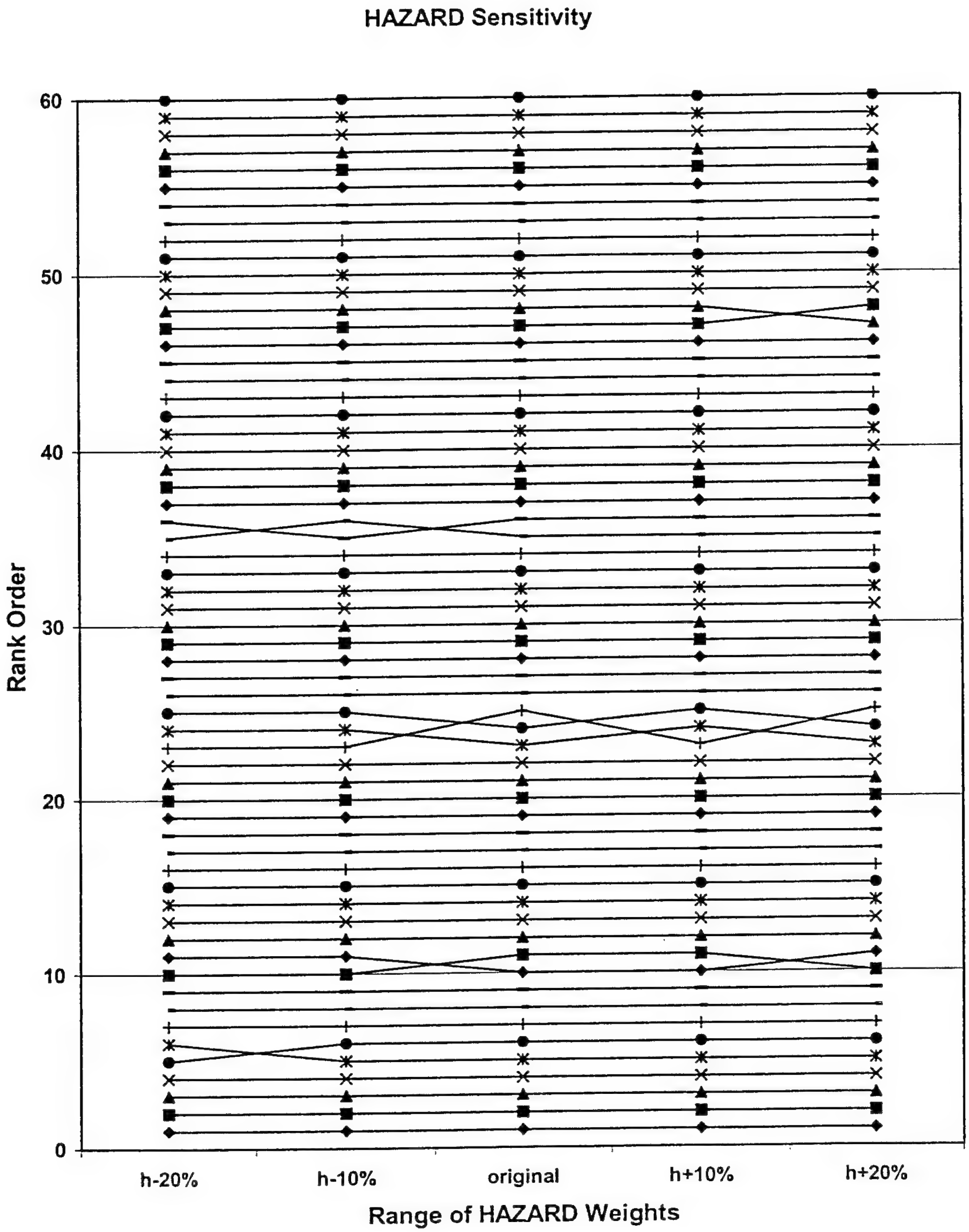

Figure 4. The rank order of equipment requests changes as the criterion weights are altered. Each line is an equipment request; intersecting lines indicate changes in the rank order as the weight for *hazard* varies (higher rankings are less preferable, the best is at the bottom of the chart). Although the leadership of the Academy is concerned about meeting *environmental* and *safety hazards*, it is apparent that this emphasis has not reached Department equipment managers. Very few items address *hazards*, or the proxy measures are not capturing *hazard's* value as shown by the graph.

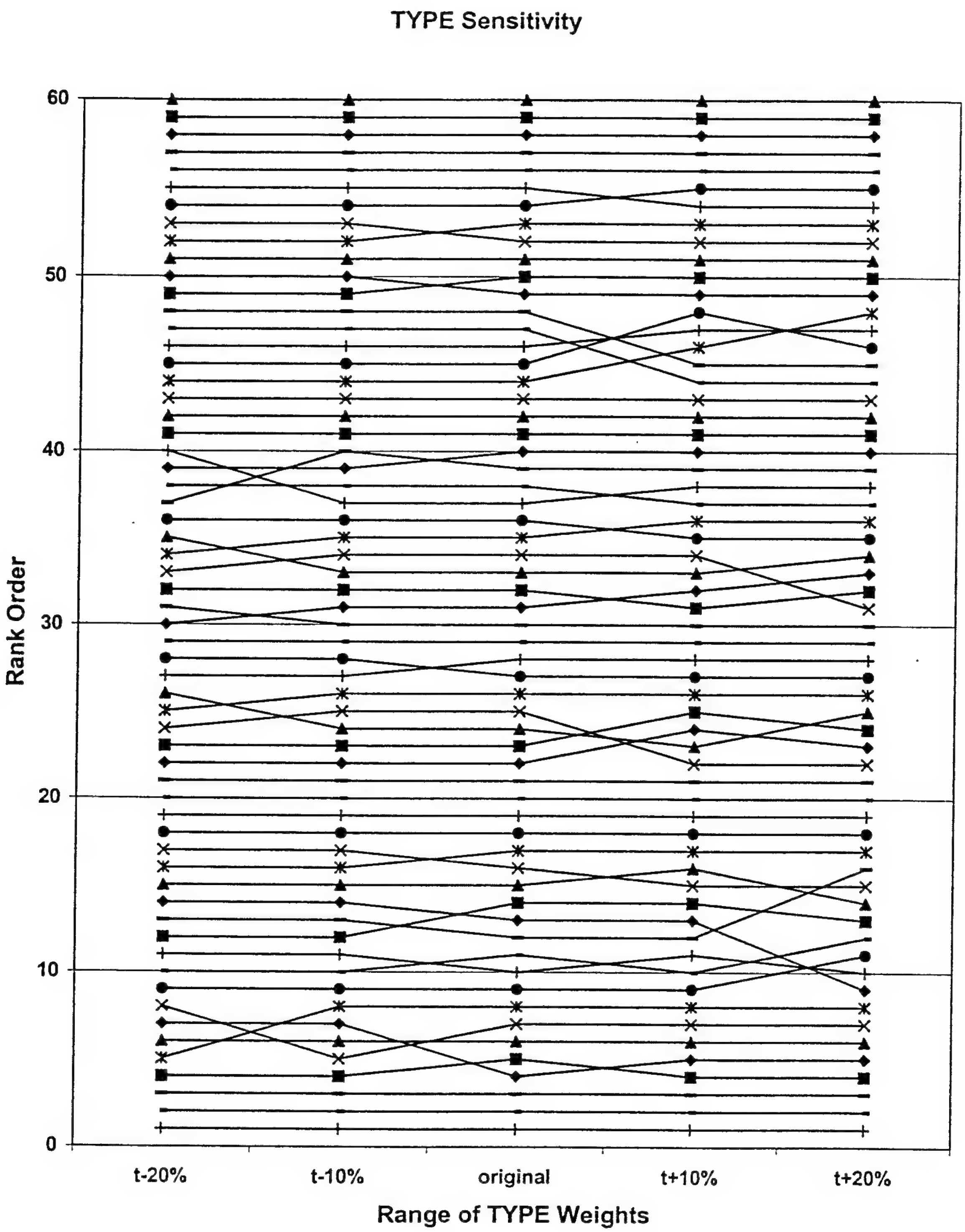

Figure 5. Changing the weight of the *type* criterion did not significantly affect the ranking although it had more effect than changing *hazard's* weight. Note that the equipment request lines cross each other more frequently than figure 4. Whether an item was *new* technology or *replacing* old technology was not significant.

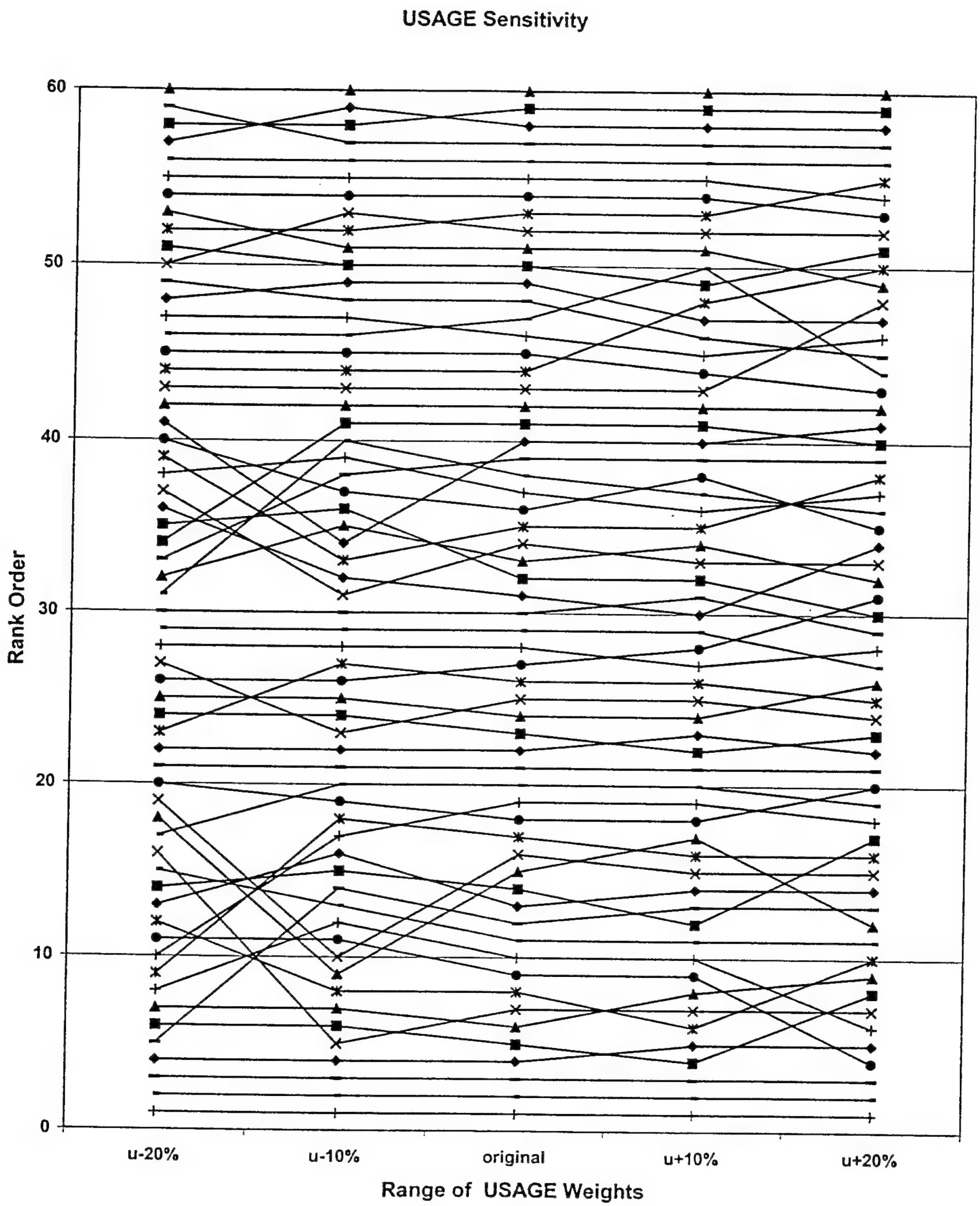

Figure 6. The DFEB considered *usage* a prime attribute contributing to the Academy mission; items not used within the classroom fell to the bottom of the rankings. This effect insures future requests are very classroom-friendly!

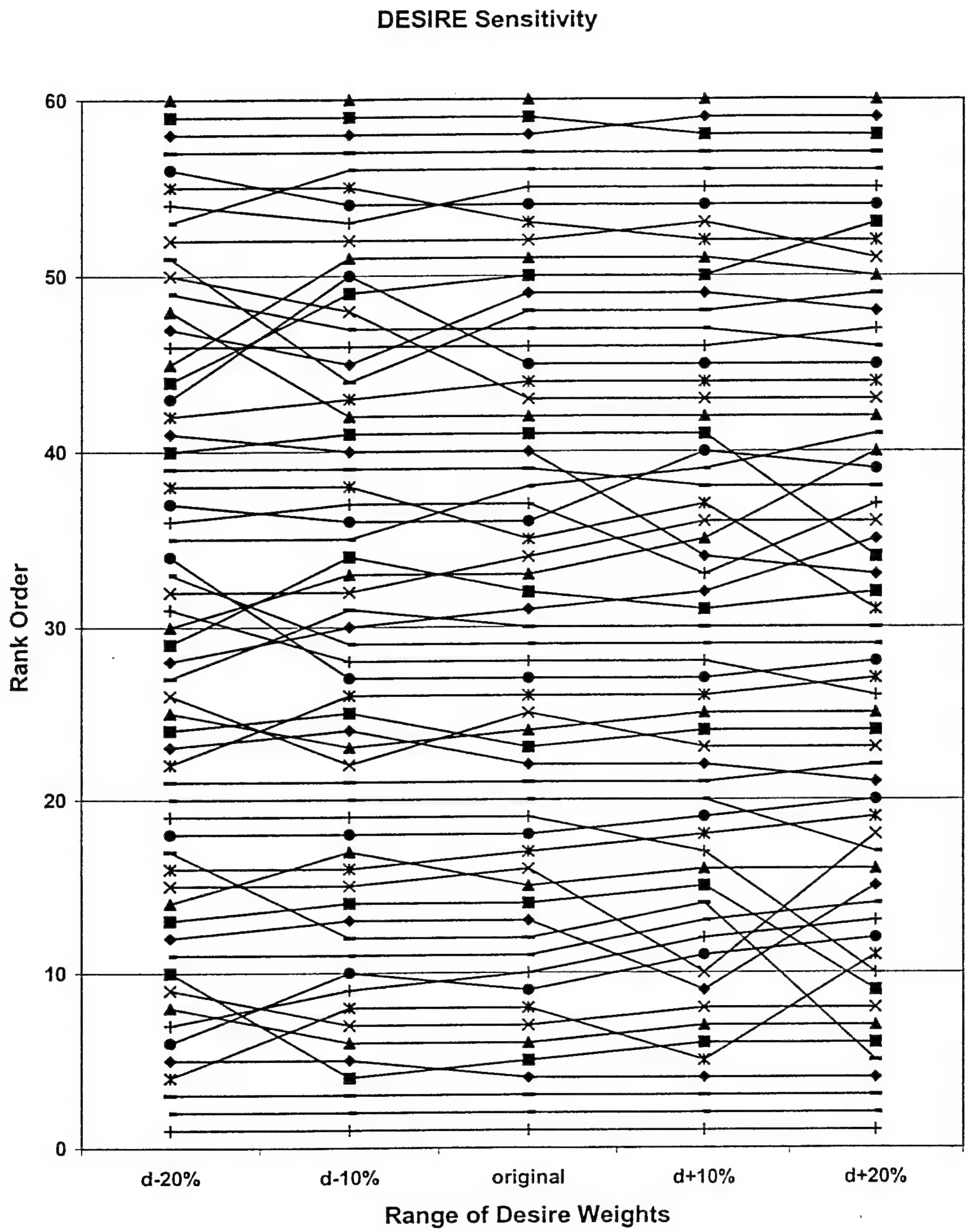

Figure 7. This figure is very important to Department Heads. They must support their equipment item requests, and the Board must carefully determine how much power they want the Departments to have. The ranking of several items plummeted as the <u>*desire*</u> weight increased, indicating the peril of departmental indifference!

scored high based upon the hierarchy, but were not their department's priority items. These equipment items were victims of DFEB's decision to consider the top two choices of each department before considering other items. Item #5 was its department's 3rd choice, even though it was in the top 5 overall. The sensitivity analysis provided information to members of the DFEB that was lost under the "top 2" criteria. The DFEB remedied this inconsistency by funding these items first as "fallout" funds came available. Since the process is intended to avoid tactics which eliminate potentially valuable equipment items, we recommend that the board refine their ***desire*** measurement to insure it captures the essence of the "top 2" criteria.

CONCLUSIONS AND FUTURE ISSUES

Value-Focused Thinking (VFT) played the primary role in the Air Force Academy's equitable distribution of budget authority to widely disparate academic departments. The approach described in this paper provided the DFEB the credible information required to immediately put into action a performance-based decision and budgeting process that considers both internal and external perspectives. It also dramatically reduced the emotionally charged debated that historically accompanied the DFEB's process.

Through VFT, the DFEB was able to allocate resources with a sound analytical foundation for a complex strategic decision. The model's criteria were based on the institutional values of education, mission, adherence to regulatory imperatives, and a sense of fairness, rather than "evenly slicing the budget pie." With institutional values providing the aegis for legitimacy, the model overcame traditional budget contentions. VFT provided a rubric for assessing how well aligned procurement decisions were to the Academy's values, mission, and objectives. Thanks to the mission impact elucidated by our approach, we did not need to utilize a post-processing optimization. In the future, as others adopt this method, benefit to cost optimizations will be necessary.

The VFT approach incorporated the dynamic fiscal environment and provided the flexibility to not only prioritize initial budget allocation, but to also address year-end budget residual. It allowed this organization to move toward implementing a results-oriented budgeting and management system, rather than focus inappropriately on the cost of each request. Since performance-based budgeting requirements will undoubtedly drive the decision-making landscape for the foreseeable future, the decision process described in this paper could provide insights for improving the decision processes for countless government and commercial organizations.

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APPENDIX

DF EQUIPMENT BOARD
EQUIPMENT REQUEST QUESTIONAIRE

1. **How many TOTAL LESSONS per SEMESTER will the requested equipment be used? Count ALL courses however count only once per course. For example; EE350, EE351, and EE352 each use an oscilloscope for 40, 35, and 20 lessons each, totaling 95.**
   a. More than 40 Lessons.
   b. More than 30 Lessons.
   c. More than 20 Lessons.
   d. More than 10 Lessons.
   e. Less than 10 Lessons.
   f. Not used in class.
2. **In which TYPES of courses will the requested equipment be used?**
   a. CORE and MAJOR'S Courses.
   b. CORE Courses
   c. MAJOR'S Courses (include Service Courses for other Departments)
   d. Not used in class.
3. **How much will the equipment you are requesting be used to support RESEARCH?**
   a. More than 30 hours per week.
   b. Between 21 and 30 hours per week.
   c. Between 11 and 20 hours per week.
   d. Between 5 and 10 hours per week.
   e. Less than 5 hours per week.
   f. Not used in RESEARCH.
4. **This equipment will support RESEARCH in how many departments/agencies?**
   a. Four or more.
   b. Three
   c. Two
   d. One
   e. Not used in RESEARCH.
5. **<u>NOT</u> including use for COURSES and RESEARCH, how much will this equipment be used?**
   a. More than 30 hours per week.
   b. Between 21 and 30 hours per week.
   c. Between 11 and 20 hours per week.
   d. Between 5 and 10 hours per week.
   e. Not used for other than CURRICULUM or RESEARCH.
6. **<u>NOT</u> including use for COURSES and RESEARCH, how many agencies will use this equipment?**
   a. Common use item for most/all of DF, 34TRW, SUPT agencies
   b. More than three departments
   c. Three departments/agencies
   d. Two departments/agencies
   e. One department/agency
   f. Not used other than in the CURRICULUM and/or research

<u>QUESTIONS 7 AND 8 APPLY TO REPLACEMENT EQUIPMENT ITEMS.</u>
<u>QUESTIONS 9 AND 10 APPLY TO NEW EQUIPMENT ITEMS.</u>

<u>FOR REPLACEMENT ITEMS: PLEASE BE SURE TO ANSWER "c" and "d" TO QUESTIONS 9 AND 10.</u>

<u>FOR NEW ITEMS: PLEASE BE SURE TO ANSWER "f" and "c" TO QUESTIONS 7 AND 8.</u>

7. Which best describes the CONDITION of the equipment being REPLACED:
   a. Inoperable, impossible or too expensive to repair
   b. Operable, but performance is significantly degraded
   c. Operable, but frequent repair is required
   d. Operable, but has exceeded expected life cycle
   e. Operable, but the equipment to be purchased is much better
   f. Not a replacement equipment item

8. How would you best describe the technology of the equipment being replaced?
   a. Item being replaced is of outmoded technology; replacement item wills significantly upgrade performance.
   b. Item being replaced is of current technology; replacement item will be of approximately the same technology and have approximately the same capabilities.
   c. Not a replacement equipment item.

9. How will the requested NEW EQUIPMENT ITEM improve CAPABILITY?
   a. Provides new capabilities: allows the using agencies to do things they are currently unable to do.
   b. Provides expanded capabilities: allows the using agencies to do more of what they're doing now, or do it more efficiently.
   c. Not a NEW EQUIPMENT ITEM

10. How would you best describe the 'technology' of this NEW EQUIPMENT ITEM?
   a. Current technology: proven performance, pretty much the "standard"
   b. New, proven technology: new on the market, and proven technology, state-of-the-art.
   c. Not a NEW EQUIPMENT ITEM

11. Purpose: In question 11, you are asked to allocate "IMPORTANCE POINTS" to each of your equipment requests. The purpose is for YOU to assess how "IMPORTANT" this request is relative to the others you have submitted. It also serves to help equalize the budget allocation among departments/agencies.

Instructions:
1. Determine how many requests your department/agency has submitted.
2. From the table below, determine how many POINTS/REQUESTS you are allowed.
3. Determine the TOTAL POINTS you have to allocated by multiplying (POINTS/REQUEST) X (NUMBER OF REQUESTS).
4. Allocate the TOTAL POINTS among your requests to indicate their RELATIVE IMPORTANCE (or DESIREABILITY). Do not allocate more than 100 POINTS to any single request.

POINTS/REQUEST TABLE:

NUMBER OF REQUEST	POINTS/REQUEST
1	100
2 to 4	90
5 to 7	80
8 to 10	70
11to 15	60

Please fill in the blank with the point allocation for this equipment item.
POINTS=______________

12. The Requested Equipment remedies a:

a. Direct Violation of NON-WAIVERABLE policy (attach documentation)."
b. Direct Violation, but presently WAIVERABLE policy (attach documentation)."
c. Violation of an IMPENDING policy, or regulation (attach documentatation)."
d. Not an environmental concern at this time."

13. The Requested Equipment remedies:

a. A Documental Safety write-up (attach BASE SAFETY OFFICE documentation)."
b. A Potential Safety hazard (attach DEPARTMENT or BASE SAFETY documentation)."
c. No apparent Safety Hazard."

THANK YOU FOR YOUR ANSWERS!

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Lt Col Steven Baker
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14. ABSTRACT
This paper offers an approach for performance-based decision making and budgeting that objectively orders alternatives according to established mission criteria. We employ a model using Value-Focused Thinking (VFT) to address the contemporary focus on performance and mission-oriented results. The laboratory equipment budget at the US Air Force Academy is used to illustrate how over $1 million of funding was allocated without the divisive claims of departmental inequity. We provide an objective rubric for assessing how well aligned the organization's decisions are relative to its stated mission. Finally, we note that the approach accommodates the flexibility to allocate initial budget allocation as well as year-end residual. As organizations make significant strides toward implementing performance-based decision and budgeting systems, VFT shows considerable promise for improving strategic mission implementation.

15. SUBJECT TERMS
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